Suicide in the Army National Guard:

What is Known for Practice Prevention, Theory, and Future Research

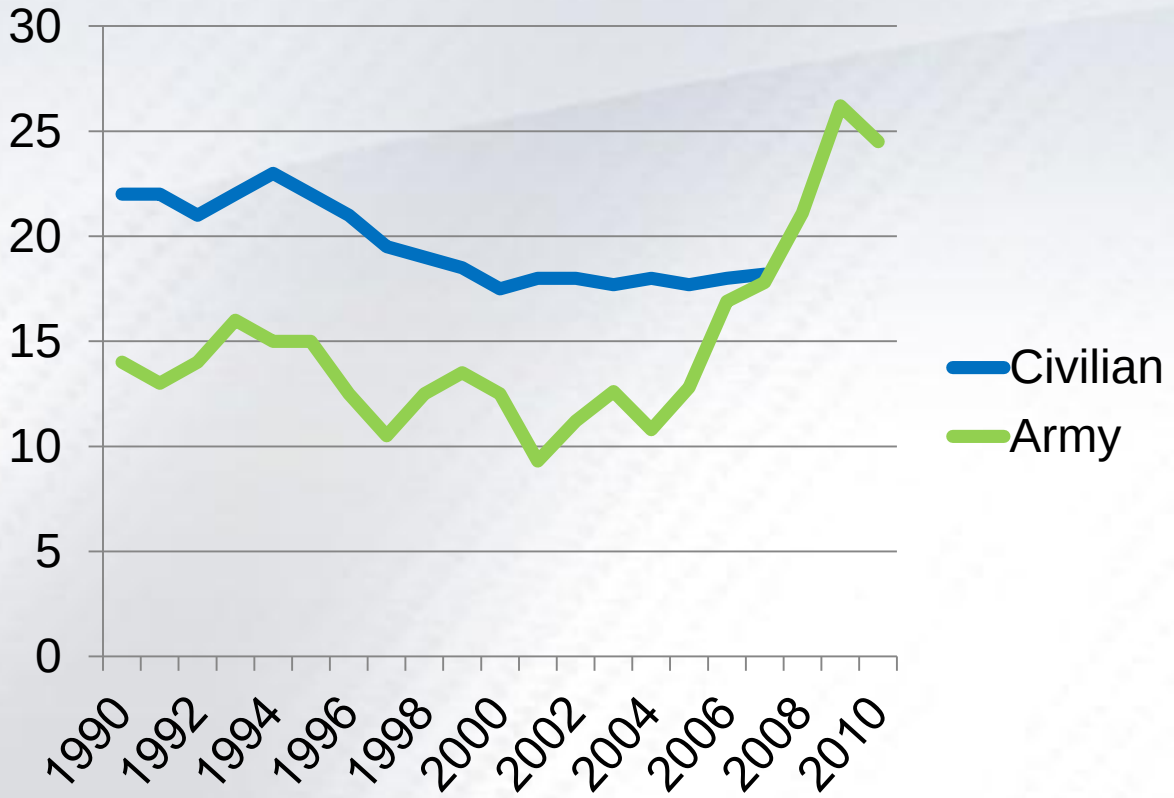
June 2012

Note. Findings and views presented here are solely those of the author and do not reflect the position of any entity, public or private. Findings have been previously peer-reviewed.

The emergent problem

Army-Civilian Suicide Rates 1990 to 2006

Historically, the Army has had lower suicide rates than comparable age-adjusted civilian rates.

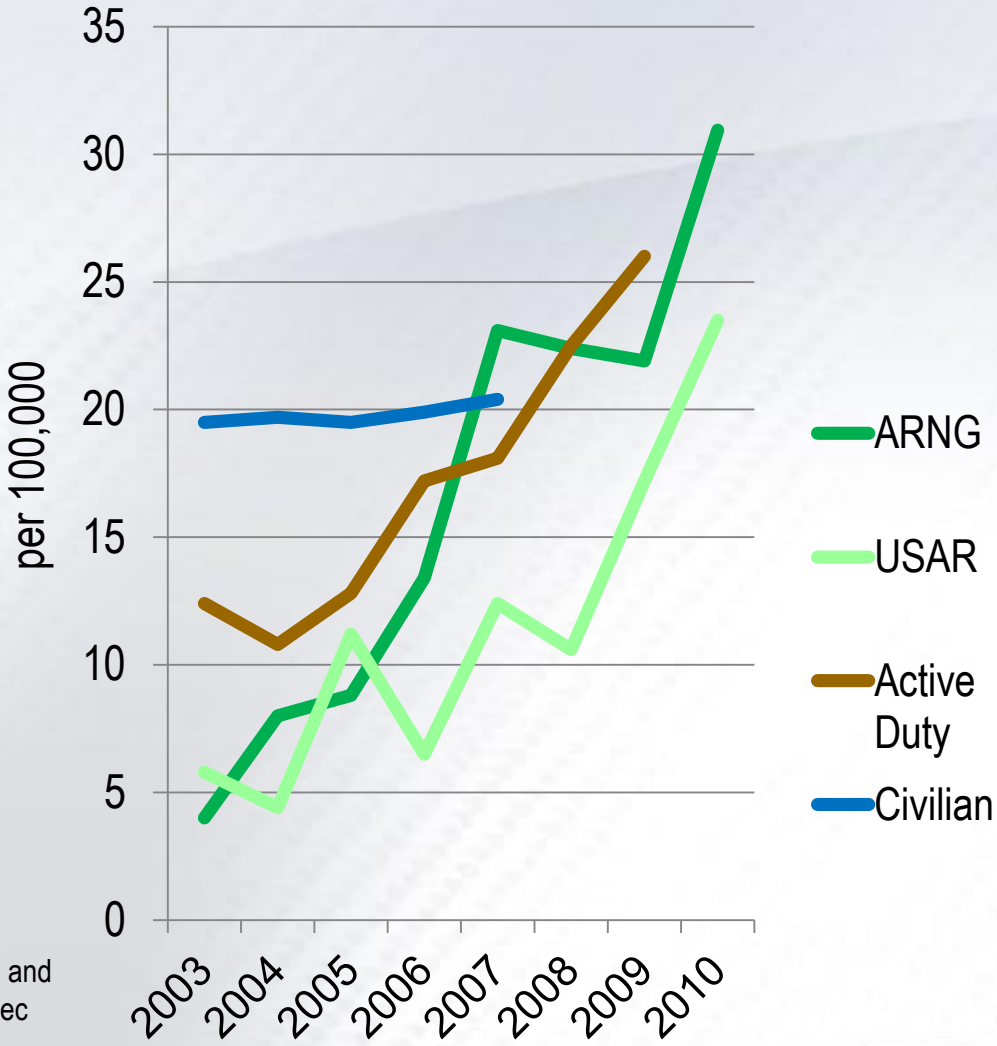


Source: CDC/NCHS, National Vital Statistics System (civilian data); G21 (Army data).

Army Suicides Rates per 100K

ARNG suicide rates have fluctuated above and below the active Army and USAR suicide rates and before 2007 was below the civilian age-adjusted suicide rate.

In 2006, the ARNG suicide rate surpassed the USAR and became more consistent with the active Army suicide rate and climbed in 2010.

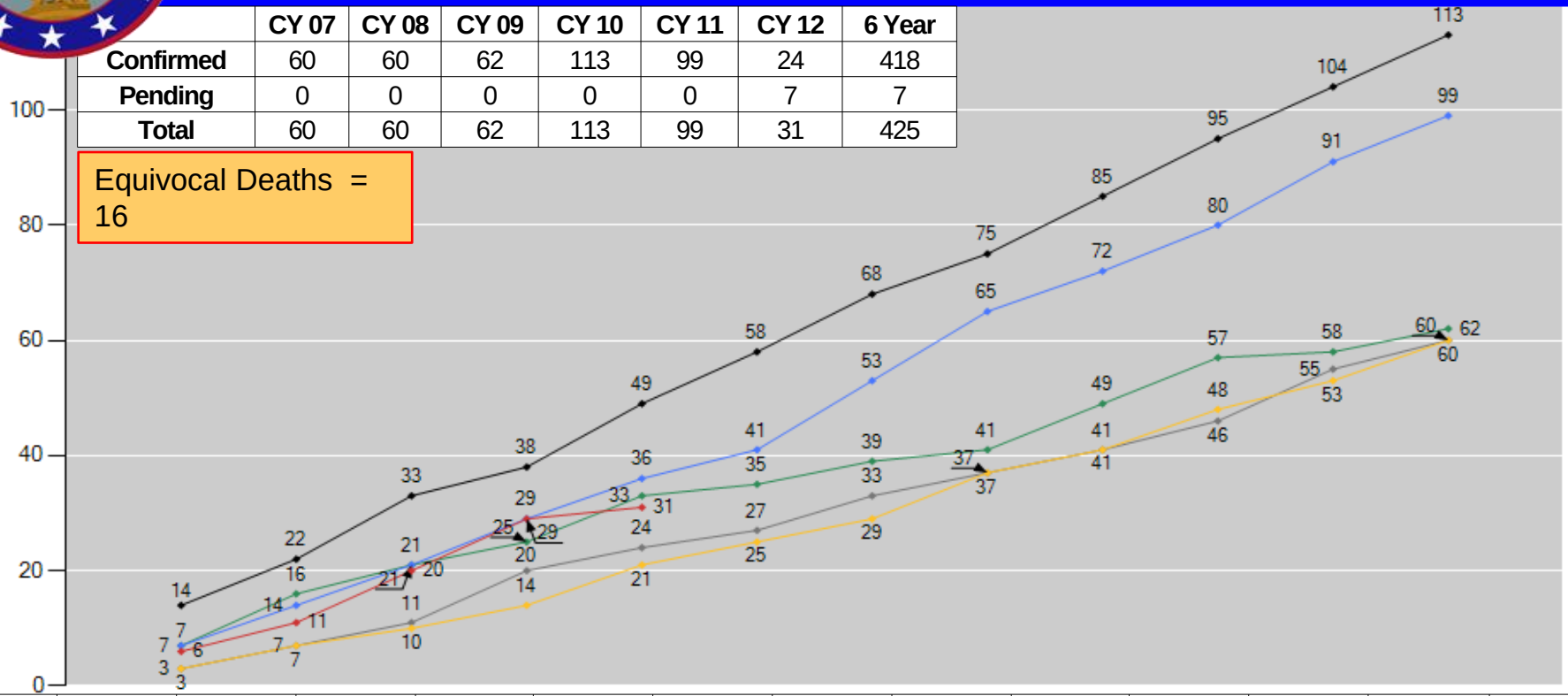


Source: Army SPS, G1, HRPD, CY2010 Demographics and Statistics, Active Duty/Not on Active Duty Suicides, 31 Dec 2010.

YTD Suicides — Cumulative: 2007 – 2012

	CY 07	CY 08	CY 09	CY 10	CY 11	CY 12	6 Year
Confirmed	60	60	62	113	99	24	418
Pending	0	0	0	0	0	7	7
Total	60	60	62	113	99	31	425

Equivocal Deaths = 16



CY	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007	3	4	4	9	4	3	6	4	4	5	9	5	60
2008	3	4	3	4	7	4	4	8	4	7	5	7	60
2009	7	9	5	4	8	2	4	2	8	8	1	4	62
2010	14	8	11	5	11	9	10	7	10	10	9	9	113
2011	7	7	7	8	7	5	12	12	7	8	11	8	99
2012	6	5	9	9	2	0	0	0	0	0	0	0	31

Key Points

1. Who, how, where, when of suicide
2. Association with organizational experience
3. Association with combat and war
4. Risk factors for suicide
5. Corroborating evidence
6. Suicides as homogenous group
7. Interpretative framework

Data analyses and data sources

Data analyses

Predictive, multivariate with 2 data sets:

1. suicide completer or not
2. suicidal behavior (thought, planned and attempted)

Data sources

1. ARNG soldiers who have committed suicide from CY2007 thru CY2011 combined with annual random samples of non-suicides (N = 5,390);

Unit Risk Inventory Surveys

2a. ARNG soldiers who have recently returned from deployment who responded to questions about combat experiences, postdeployment stressors, and suicidal behavior (N = 4,567); and

2b. ARNG soldiers largely at home station who responded to questions about current stressors, suicidal behavior, and earlier lifetime experiences (N = 15,597).

"Caveats" -- Inherent problems with investigation of suicide

- No a priori data can be gathered before suicide on both suicides and non-suicides, e.g., 37-liner data, "romantic relationships" available for suicides after the event but not non-suicides
- Thus, must rely on existing archival data sources. Limited to couple dozen variables. Many variables likely contribute to suicide risk, including previous life experiences, genetic make-up, etc., yet were lacking in the analyses.
- Low occurring event =

  --problems for estimates (MUCH error)

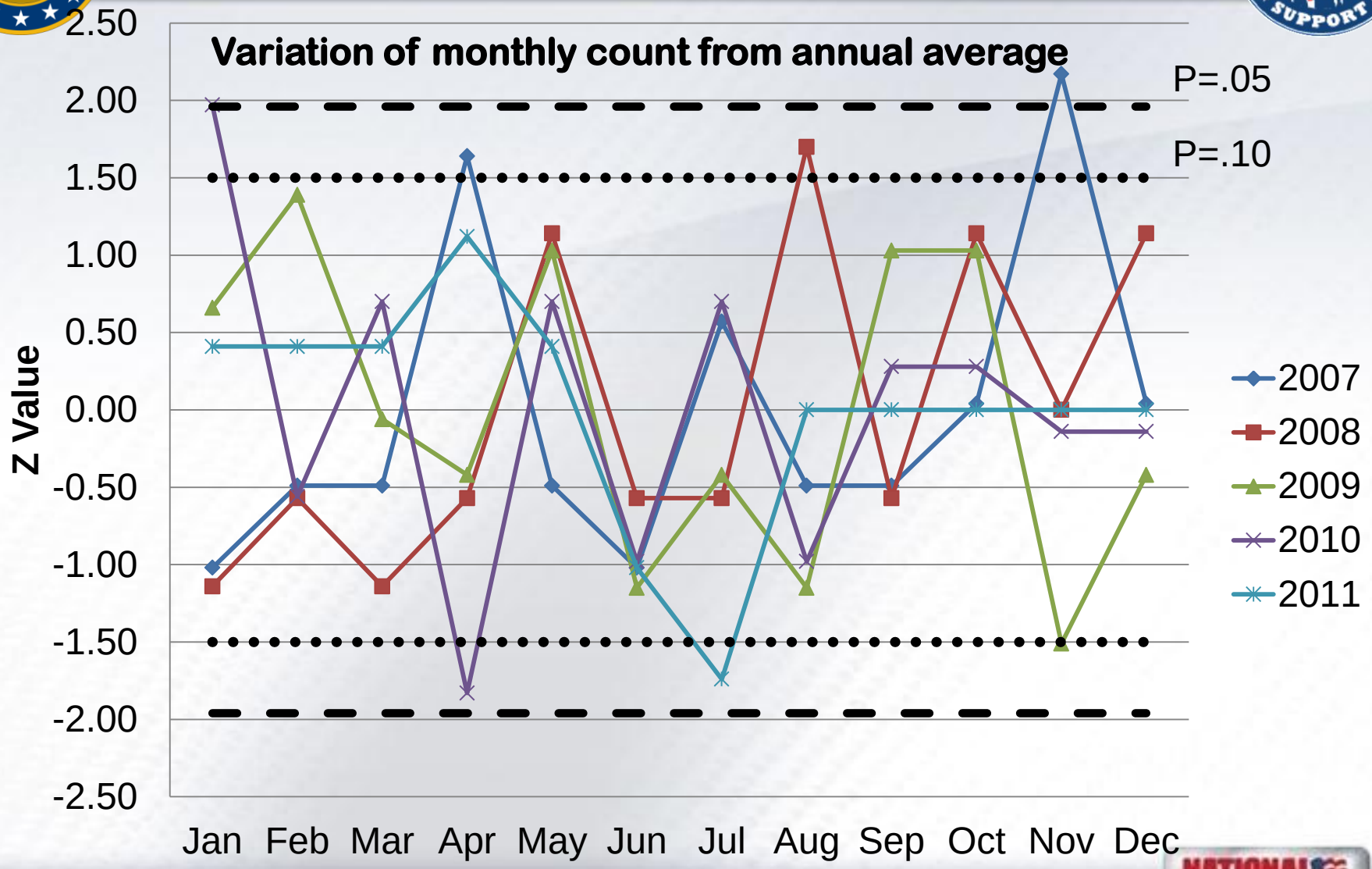
  --research design ("rare events" analyses and associated problems)

1. Who, how, where, when of suicide

Who, how, where, when of suicide

CY 2007-2012	% of total
Who	
Soldier category (PT/M-day)	88.5%
Where	
Not on active duty	80.2%
How	
Gun shot	66.7%
Hanging	17.0%
Column N (denominator)	425

Suicide and seasonality – not observed



2. Association with organizational experience

ARNG-USAR: Nothing uniquely different about military service

ARNG-USAR E1 thru E4

-- Data were examined from the 2009 Status of the Forces Survey RC Members

-- Responses of ARNG and USAR soldiers were compared across several content areas, including satisfaction overall, satisfaction with leadership, unit cohesion, and assigned job.

-- **Soldiers responded similarly**, and in some cases, ARNG soldiers gave more positive responses concerning their unit and service.

Survey Item	ARNG (N=1,077)	USAR (N=572)	
Overall Satisfaction with Reserve Service	**% agreed**		
Satisfied with military life	72	69	+3
Enjoy serving in reserve	79	71	+8*
Proud to serve	82	77	+5
Retention Intentions	**% agreed**		
Likely choose to stay	63	59	+4
Leadership	**% agreed**		
Trust immediate supervisor	74	71	+3
Immediate supervisor treats fairly	70	73	-3
Conflict between supervisor and supervised	22	19	+3
Satisfied with supervision	65	67	-2
Micromanaged	37	32	+5
Chain of command will listen	63	59	+3
Would go to leaders with personal problem	54	50	+4
Cohesion			
Coworkers put forth effort	66	60	+6*
Coworkers get along	77	77	0
Coworkers help each other	75	74	+1
Satisfaction with Assigned Job	**% agreed**		
Work makes use of skills	62	59	+3
Satisfied with work	66	62	+4
Work provides sense of pride	73	65	+8*
Readiness	**% well prepared**		
Self prepared for wartime	75	67	+8*
Unit prepared for wartime	65	60	+5
Training to perform wartime missions	70	65	+5

* Row percentages must exceed 5% to be statistically significant, $p < .05$ two-tailed.

Source: Defense Manpower Data Center (2009, released July 2010). Status of Forces Survey of Reserve Component Members: Tabulations of Responses (DMDC report no. 2010-002). Arlington, VA : DMDC. .

ARNG has more soldiers having at-risk attributes

Proportionally, the ARNG has **more soldiers having at-risk factors** than does the USAR:
--Younger in age (18-24 years old)
--More males
--More junior ranking enlisted
--More junior enlisted with <= 2 yrs mil svc
Proportionally, **more ARNG solider have less military experience and yet to be integrated into military service:**
--Fewer prior service
--More awaiting training

Background Characteristic, 2009	ARNG		USAR		
	N	%	N	%	% difference
Of enlisted:					
18-24 years	125,749	39.3	58,025	34.4	+4.9
Male	273,479	85.5	129,577	76.8	+8.7
E1-E4	181,084	56.6	91,500	54.2	+2.4
E1-E4, <= 2 yrs mil svc	94,058	29.4	46,362	25.6	+3.8
Of 2010 gains:					
NPS	36,757	64.9	12,744	46.2	+18.7
Of those enlisted in training:					
Awaiting training	16,155	43.4	5,815	36.5	+6.9

What is most associated with suicide?

Prediction of 2007-2011ARNG Suicides by Soldier Characteristics (Logistic Regression)

Predictor Variable	r with suicide	Regress Coefficient	Odds-Ratio	R^2 Added	% of Total R^2
Male	.07**	1.23***	3.41		
White	.05**	0.53***	1.69		
17-24 years	.02	0.26+	1.30		
25-29 years	.03*	.32*	1.38	.027	46.5%
Married	-.03*	-.31*	0.73	.002	3.4%
Alt HS degree	.03*	.37*	1.45	.003	5.2%
In-training	-.04**	-.69***	0.50	.	
Never deployed	.00	.00	1.00		
Combat MOS	.03	.10	1.11	.007	12.1%
Western US	.05**	.54***	1.71	.008	13.8%
Year 2007		-.61***	0.54		
Year 2008		-.61***	0.54		
Year 2009		-.59***	0.56		
Year 2011		-.12	0.89	.011	19.0%
Constant		-3.95	0.02		
X^2 (4,14) =	128.96				
Total R^2				.058	100.0%

- **Primary risk factors are:** Young ages, males, whites

- **Military related variables**

-- show low association with having committed suicide

-- contribute small amount of explanatory variance

Notes. N = 5,390, 2007–2011 suicides plus random sample of soldiers each CY for comparison. Variables which were highly correlated with predictor variables were not considered to avoid multicollinearity problems. Odds-ratio is the amount of times the variable value (e.g., male) is more likely to commit suicide than the reference group (e.g., female), i.e.., males are 3.41 more likely than females to commit suicide, etc.
* $p < .05$, ** $p < .001$.

Why such a simple model?

Variables Associated with Suicides (CY2007-CY2010)

Variable	Association with Suicide (simple r)	Other Variables Related to Variable in First Column
Age	**-.05*** **	Rank (.58), Single (-.59), Married (.49), Prior service (.56), Years of service (.86)
Male	**.06*** **	
White	**.06*** **	MCAT (-.25)
African American	-.07***	
Single	.00	Age (-.59), Rank (-.40), Prior service (-.40), Years of service (-.55), Deployed (-.29)
Married	-.04***	Age (.49), Rank (.35), Prior service (.35), Years of service (.46), Deployed (.24), In-training (-.23)
M-day	.05***	Deployed (-.32), In-training (-.52)
Rank	-.05***	Age (.58), Single (-.40), Married (.35), Prior service (.48), Years of service (.62), Deployed (.26)
Years of service	-.06***	Age (.86), Single (-.55), Married (.46), Rank (.62), Prior service (.52), Deployed (.35), In-training (-.33)
Prior service	-.01	Age (.57), Rank (.48), Single (-.40), Married (.35), Years of service (.52), Deployed (-.23)
Deployed	-.01	Age (.28), Rank (.26), Single (-.29), Married (.24), Years of service (.35), In-training (-.32)
MCAT Cat I=1, Cat 5=6	-.01	White (-.25)
Alternative HS degree	.02	
No HS degree	.01	
TTAS exempt	.00	
In-training	-.03*	Age (-.32), Rank (-.24), Single (.26), Married (-.23), Prior service (-.23), M-day (-.52), Years of service (-.33), Deployed (-.32)

Notes. N = 3,636, 2007–2010 suicides plus random sample of soldiers each CY for comparison.
* p < .05, ** p < .01, *** p < .001, two-tailed.

3. Association with combat and war

Prediction of Postdeployment Suicidal Behavior by Deployment Suicidal Behavior, War Experiences, and Postdeployment Stressors (from 2010 URI-R data)

Predictor Variable	% of sample	r with suicide	Std Coefficient	R^2 Added	% of Total R^2
Suicidal behavior during deployment	4.2% (thoughts)	.65**	.60**	.396	96.4%
War Experiences					
No. of deployments in last 6 mos	64.9% (first)	.07**	.03*		
Length of deployment	89.8% (7-12 mos)	.06**	.01	.001	0.2%
Witness combat trauma	20.0%	.15**	.01		
Direct combat	20.0%	.07**	.02+		
Killed someone	4.5%	.09**	.00		
Lose friend	14.9%	.03	-.01		
See wounded, killed, or dead	20.0%	.03*	.00	.001	0.2%
Postdeployment Stressors					
End of sig relationship	20.0%	.17**	.08***		
Financial troubles	11.8%	.18**	.02		
Major life change	10.2%	.17**	.07***	.013	3.2%
F (11,4040)	258.17***				
Total R^2				.411	100.0%

+ p < .10,
* p < .05,
** p < .01,
*** p < .001.

Soldiers Reporting Suicide Symptoms during Deployment and After Deployment and by Combat Experiences (2010 URI-R)

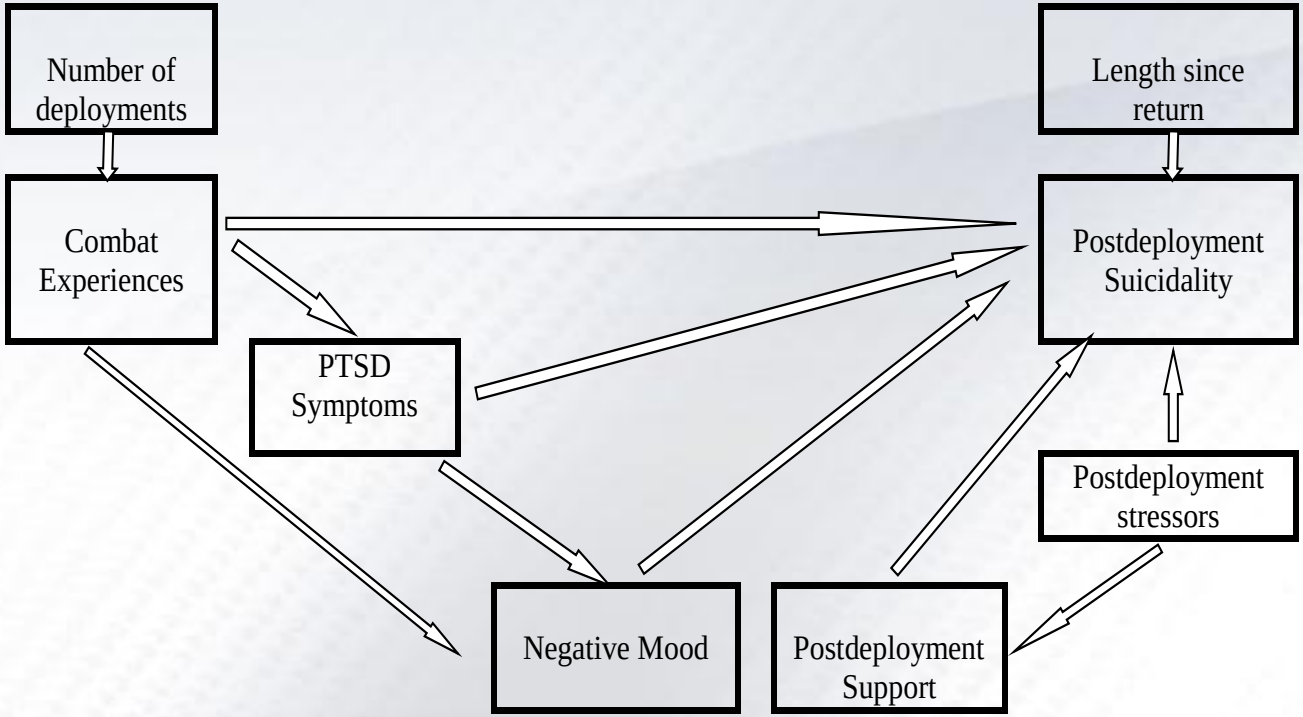
Suicide Symptoms During deployment / After deployment	% of Total		
No / No	5%		
No / Yes	1.4%		
Yes / No	1.7%		
Yes / Yes	2.8%		
Column N	4,642		
Suicide Symptoms During deployment / After deployment	**No Combat Experiences**	**Experienced Combat**	**Z test b/n row %s**
No / No	95.3%	93.3%	-2.93**
No / Yes	1.1%	1.7%	1.74+
Yes / No	1.6%	1.7%	0.26
Yes / Yes	2.0%	3.3%	2.77**
Column N	1,824	2,818	

FINDINGS:

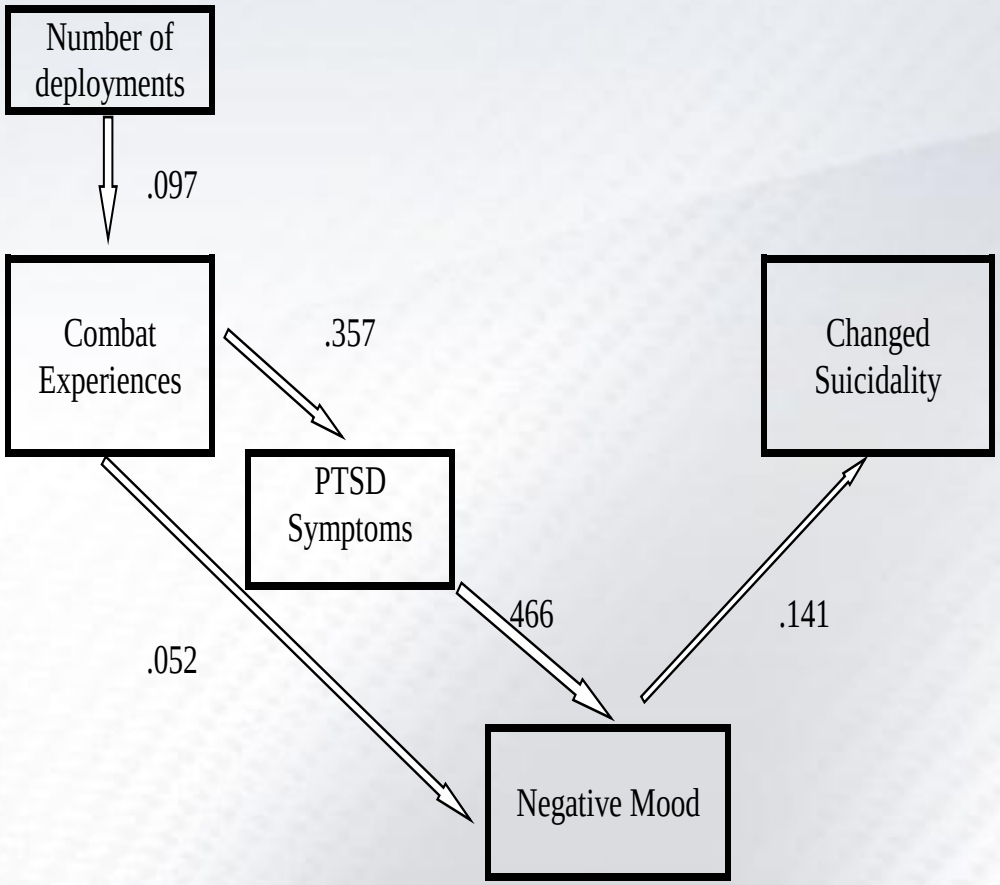
- Suicide ideation has low prevalence.
- % change (+) in deployment-to-postdeployment ideation is low.
- Combat experiences show low correlation with changed ideation.

Data source: CY2010 URI-R survey, N = 4,567 soldiers in 50 units.
+ p < .10; ** p < .01, two-tailed.

War experiences, PTSD , and suicide
(model founded in the research literature)



Final SEM Analysis Regarding the Relationships Among Number of Deployments, Combat Experiences, Postdeployment PTSD Symptoms, Negative Mood, and Changed Suicidality



FINDINGS:

- **Path to changed suicidality is best described from combat experiences thru PTSD symptoms and then thru negative mood.**
- **No direct combat experiences to suicidality, nor PTSD to suicidality.**

Notes.
N = 4,567. All regression coefficients are standardized and statistically significant, $p < .001$. Model-data fit indices: $X2 (5) = 19.68$, $p < .001$; CFI = 0.992; RSMEA = 0.025.
Combat experiences are the residuals from a univariate general linear model in which unit membership was the factor and combat experiences comprised the dependent variable.
Changed suicidality represents a "change score," is the residual from deployment suicide regressed on postdeployment suicidality.

4. Risk factors for suicide

Suicide risk factors

Not related to military service

Primary risk factors are demographic:

- **Age (17-24 yrs and 25-29 yrs)**
- **Gender (male)**
- **Race (white)**
- **Untreated past and/or current behavioral health condition no follow-up (US Army Public Health Command)**

5. Corroborating evidence

Findings have validation

- **Consistent with civilian research literature**

  Similar suicide factors such as age (young adults), gender (male), and race (non-Hispanic white) are found in the civilian population (Karch, Logan, & Patel, 2011; Kessler, Berglund, Borges, Nock, & Wang, 2005; Pagliaro, 1995).

- **Consistent with research conducted on AD Army suicides by US Army Public Health Command**

  US Army Public Health Command reported suicides occurred disproportionally among males, Caucasians, younger in age (18 to 24 years), and often had untreated behavioral condition and/or substance abuse (Black et al., 2011; Millikan et al., June, 2011 and October, 2011)

CDC National Statistics – consistent with ARNG

- Males take their own lives at nearly four times the rate of females and represent 79.0% of all U.S. suicides.
- Young adults ages 15 to 34 (19.7 per 100,000) are 1.8 times higher than the national average for that age group (11.1 per 100,000).
- Firearms are the most commonly used method of suicide among males (56.0%).

Source: Centers for Disease Control and Prevention (CDC). Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. (2007). National Center for Injury Prevention and Control, CDC (producer) (accessed March 2, 2012 www.cdc.gov/injury/wisqars/index.html).

Army Study To Assess Risk and Resilience in Servicemembers, Preliminary Findings --consistent with ARNG

TRENDS OVER TIME: Suicide rate increased over time for soldiers in all settings (i.e., those never deployed, currently deployed and previously deployed).

SAME FINDING

DEPLOYMENT: Suicide rate was highest among currently deployed (18.3 deaths per 100,000) and dropped after deployment (15.9 per 100,000). From 2004 through 2008:

--23 percent of the soldiers studied were currently deployed,

--42 percent had never been deployed and

--35 percent had been previously deployed but were not currently deployed.

SIMILAR FINDING – Suicide correlates very weakly having been deployed.

Army Study To Assess Risk and Resilience in Servicemembers, Preliminary Findings --consistent with ARNG

MARRIAGE:

Being married is associated with lower risk of suicide during deployment (e.g., 15 per 100,000 among those married compared to 24.5 per 100,000 among those never married).

SIMILAR FINDING

CONCENTRATION OF RISK:

22% percent of suicide deaths occurring to the 5 percent of soldiers with the highest suicide risk profile:
gender, age, education, marital status, and race

SIMILAR FINDING

And career-related variables, e.g.: Rank, time in service, and deployment status .

SIMILAR, though these overlap with characteristics above, i.e., due to young age, one is lower rankling, less time in service, etc.

6. Suicides as homogenous group -- Who, why

How can suicides (CY 2007 – CY2010) be best characterized as combination of data elements?

Used a hierarchical cluster analysis that examines commonalities among cases based on set of data elements.
Results suggested a two cluster solution.
Specifying 2 cluster solution, a K-means cluster analysis was conducted; below are results.

Variable	Cluster 1 "Careerists" N = 96 (34.9% of total) Mean	Cluster 2 "First-termers" N = 179 (65.1% of total) Mean	Statistical test of row difference t-value and p-level
Age	38.8 yrs	23.8 yrs	23.54***
Male	95.8%	94.4%	0.51, ns
White	89.6%	82.1%	1.64, ns
African American	4.1%	4.5%	-0.12, ns
Single	26.0%	60.3%	-5.72***
Married	53.1%	27.4%	4.36***
Alternative HS	8.3%	14.0%	-1.37, ns
MCAT, 3 = IIIA, 4 = IIIB	2.89	3.03	-1.03, ns
Rank	6.47 SSG-SFC	3.68 PFC-SPC	9.92***
Prior service	72.9%	21.8%	9.50***
YOS	14.1 yrs	5.22 yrs	11.68***
M-day	64.6%	82.7%	-3.43***
In-training	2.1%	10.1%	-2.44*
Deployed	66.7%	37.4%	4.80***

Notes. Multivariate F (14, 229) = 48.90, p < .001. Listwise deletion was used, N = 275 for CY2007–CY2010 suicides. Note MCAT was used in initial cluster analysis and then dropped due to missing data. Results were similar to those presented here.
* p < .05, *** p < .001; ns = nonsignificant.

Summary of the two clusters

"Careerists" N = 96 (34.9% of total)	"First-termers" N = 179 (65.1% of total)
Older	Younger
Male	
White	
Married	Single
Cat IIIA/B	
SSG-SFC	PFC-SPC
Prior service	Non-prior service
14 years of service	5 years of service
Less likely M-day	More likely M-day
Less in training	More in-training
Deployed	Not deployed

How the two clusters compare on the Suicide Incident Report ("37-liner")

	"Careerists" % (N=96)	"First-termers" % (N=179)	Pairwise F
Findings associated with Cluster 1			
Prior suicide attempts	7.3	3.4	2.16++
PTSD	8.3	3.9	2.37++
DUI/DWI	7.3	1.7	5.70*
Chronic pain	5.2	2.8	1.04
Death of companion	4.2	1.7	1.56
Antisocial	4.2	1.1	2.73+
Spouse abuse	4.2	1.1	2.73+
School discord	5.2	1.1	4.25*
Serious injury	2.1	0.6	1.34
Terminal illness	1.0	0.0	1.87+++
Access to firearms	56.3	43.6	4.05*
Findings associated with Cluster 2			
Suicide ideations	5.2	10.1	1.92++
Isolation	5.2	10.1	1.92++
Mood anxiety	5.2	8.9	1.23
Job discord	3.1	6.7	1.55+++
New occupation	0.00	2.2	2.18++
Findings associated with both clusters -- not included in comparisons			
Alcohol abuse	16.7	12.3	
Past behavioral health problems	14.6	12.9	
Loss of significant other	13.5	14.0	
Insufficient income	10.4	11.2	

Notes. Results were limited to the CY2009 and CY2010 data, as DA Form 15-6 information was not captured until CY2009. Multivariate test, Wilk's Lambda $F(16, 258) = 2.37$, $p < .01$. For pairwise F values, * $p < .05$, + $p < .10$, ++ $p < .15$, +++ $p < .20$.

Suicides – One group or several?

- **Among suicides (2007-10), there appears to be 2 clusters of suicides**

  --First-termers (2/3 of suicides)

  --Careerists (1/3)

- **The two clusters differ systematically in demographics (hence, the labels) and more importantly in events surrounding suicide.**

  --First-termers appear to be "acute" / covert suicides (suicide ideations, loneliness, and mood), whereas "careerists" appear to be "chronic" / overt suicides (prior suicides, trouble with personal relationships, DUI/DWI, PTSD and other problematic health conditions.

Summary

- Suicide in the ARNG has more likely to do with "who you are," rather than with any adverse experiences in the military.

- Primary risk factors are being young in age, male, and white with behavioral health condition which has been largely untreated – much like those observed in the civilian research studies.

- Prevalence of suicide in the military is likely higher due to proportionally more of those at-risk for suicide who serve -- young white male.

- Too, there army be experiences in the military that exacerbate already existing risk factors, e.g., behavioral health problems combined with circumstances associated with serving in the military – isolation, loss of significant relationships, etc.

7. Interpretative framework

- **Age-specific task (Erikson, 1968)**
  --Identity versus role confusion
  --Intimacy versus isolation

- **Exacerbated by … current broad sociological events?**
  -- Portes et al. (2002) made connections between suicide attempts among adolescents and high levels of stress, lack of family support, and identity problems (Grob, 1983; Wagner, Cole, & Schwartzman, 1995).
  -- Shift risk to younger age groups due to increases in drug and alcohol use and depression among youth (Capaldi & Stoolmiller, 1999; Conner & Goldston, 2007)
  -- Risk shift to attitudinal and behavioral characteristics of recent generations known as "millenials" (Warner, 2010; Zemke, Raines, & Filipczak, 2000), and altered family structure (Stockard & O'Brien, 2002).

7. Interpretative framework

- **Other demographics**

  Socialization of males (Maris et al., 2000)

  -- more likely to engage in suicide risk behaviors, such as alcohol abuse, access to firearms, and shame of failure.

  -- less likely to engage in protective behaviors, such as seeking help for problems, being unaware of signs of personal distress, having less flexible coping skills, and less developed social supports.

  Social support

  Extended support network afforded to African Americans (Early, 1992; Gibbs, 1997; Hetherington & Parke, 1975; Kubrin & Wadsworth, 2009; Lareau, 1987; Stack, 1974; Taylor, Chatters, Tucker, & Lewis, 1990).

Implications for policy

- **Screen current soldiers at-risk**.

- **Once identified, develop protocol for determined follow-up**. The recent U.S. Army Public Health Command noted that among 2005-2009 suicides, about one-half (48%) had received outpatient care for behavioral health disorders. Among the 2006 to 2009 suicides, 52% had reported two depressive items and 44% reported one PTSD symptom, yet very few were referred and followed-up (6%) (U.S. Army Public Health Command, 2010). For Guard personnel, this protocol needs to include a mechanism for personnel to receive mental health treatment in the military health care system.
- **Train in the handling of firearms**. Most who committed suicide use fire arms. Research also has shown that the availability of fire arms to those contemplating suicide is major determinant for following through (Kubrin & Wadsworth, 2009). Mann et al. (2002) suggested greater "means restriction" as a preventive strategy. Indeed, research on the availability of fire arms ("opportunity hypothesis") supports the idea that restriction would reduce suicide (see also the recent RAND report, Ramchand et al., 2011).

Implications for policy

- **Train those at-risk to recognize symptoms**. Training needs to be developed explicitly for soldiers who are at-risk for suicide. The current Army suicide prevention programs (ACE education program) are directed primarily at those who might recognize suicide intentions in others and not in themselves.

- **Screen prospective recruits**. At present, screening methods to assess psychological adjustment do not lend themselves to consistent administration, scoring, and follow-up. The initial induction interview conducted by medical personnel at the MEPS (military entry processing station) consists of a few open-ended questions, not having standard scoring and criteria for referral.

Questions, comments?

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